

29. April 2010

Semantic Web Services

## Exercise sheet 6

### Semantic Web

#### Exercise 1 (Overview Questions) (5 points)

Please to answer these questions to the best of your knowledge.

- a) Which novelty and advantages does Semantic Web bring comparing to Web 1.0 and Web 2.0?
- b) We learned about several concepts to represent data in the “Semantic Web” lecture. What are the conceptual differences between the data model of XML and the data model of RDF? Compare the features and application areas of supporting APIs for XML and RDF.
- c) Compare query languages XPATH and SRARQL. What are the main concepts and similarities, what are the main differences? Can you recognize relations to Relational Database Query languages such as SQL?
- d) What does OWL add on top of RDF/RDFS? In what sense is OWL DL more restrictive than RDFS?

#### Exercise 2 (OWL Ontologies) (5 points)

Find an OWL ontology, for instance using Swoogle Semantic Web search engine (<http://swoogle.umbc.edu>), and explain at least five different concepts and properties in the ontology by using the relations and axioms you can find in the ontology itself. Pick an ontology which uses some constructs not expressible in RDFS.

### Exercise 3 (Compliance to Schema) (5 points)

Clarify in which ways the following RDF annotation representing a Person (Listing 1) does not comply with the FOAF schema. What are changes needed to be done to make this annotation compliant with the FOAF specification?

Listing 1: RDF annotation representing a Person

```
<rdf:RDF
  xmlns:j.0="http://xmlns.com/foaf/0.1/"
  xmlns:j.1="http://www.deri.org/person#"
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" >
  <rdf:Description rdf:about="http://www.dieter.fensel">
    <j.0:depiction>http://www.deri.at/images/members/dieter_fensel.jpg</j.0:depic
tion>
    <j.1:workStreetAddress>Technikerstrasse 21a</j.1:workStreetAddress>
    <j.0:givenname></j.0:givenname>
    <j.0:mbox>dieter.fensel@sti2.at</j.0:mbox>
    <j.0:homepage>http://www.fensel.com</j.0:homepage>
    <j.1:middle_name></j.1:middle_name>
    <j.1:workOrganization>University of Innsbruck</j.1:workOrganization>
    <j.1:workDepartment>Institute of Computer Science</j.1:workDepartment>
    <j.1:workPostalCode>A6020</j.1:workPostalCode>
    <j.1:workFaxNumber>+43 512 507 9872</j.1:workFaxNumber>
    <j.1:workCity>Innsbruck</j.1:workCity>
    <j.0:name>Univ. Prof. Dr. Dieter Fensel</j.0:name>
    <j.1:workPhoneNumber>+43 512 507 6485, 6488</j.1:workPhoneNumber>
    <j.1:workCountry>Austria</j.1:workCountry>
    <j.0:title></j.0:title>
    <j.0:family_name>Fensel</j.0:family_name>
  </rdf:Description>
</rdf:RDF>
```

## Exercise 4 (SPARQL) (5 points)

Answer the questions about SPARQL queries.

a) Given the following data and SPARQL query, which result will the query deliver?

Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
_:a foaf:name "Anna" ;
foaf:mbox <mailto:anna@example.net> .
_:b foaf:name "Ioan" .
```

SPARQL query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?name WHERE {
?node foaf:name ?name .
?node foaf:mbox ?mbox .
}
```

b) Given the following data and SPARQL query, which result will the query deliver?

Data:

```
@prefix dc10: <http://purl.org/dc/elements/1.0/> .
@prefix dc11: <http://purl.org/dc/elements/1.1/> .
_:a dc10:title "SPARQL Query Language Tutorial" .
_:b dc11:title "SPARQL Query Language (2nd ed)" .
_:c dc10:title "SPARQL" .
_:c dc11:title "SPARQL" .
```

SPARQL query:

```
PREFIX dc10: <http://purl.org/dc/elements/1.0/>
PREFIX dc11: <http://purl.org/dc/elements/1.1/>
SELECT DISTINCT ?title
WHERE { { ?book dc10:title ?title } UNION
{ ?book dc11:title ?title } }
```

c) What does the following SPARQL query performing?

```
CONSTRUCT { ?friend pim:fullName ?name .
?friend foaf:mbox ?mbox }
WHERE { ?person foaf:knows ?friend .
?friend foaf:given ?name .
```

```
?friend foaf:mbox ?mbox .  
FILTER regex(?person, "Anna") .}
```